

Appl. No. 10/531,166
Amdt. dated Oct. 10, 2008
Reply to Final of July 11, 2008

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-19. **(Cancelled)**

20. **(Currently amended) The fuel injection device according to claim 38 A fuel injection device (1) adapted to be connected to a high-pressure source (2), said fuel injection device (1) comprising:**

a multi-part injector body (4; 8, 9, 10);

an injection valve element (24) in said multi-part injector body for blocking or unblocking at least one injection opening (25);

a nozzle chamber (23) enclosing the injection valve element in the region of a pressure shoulder provided on the injection valve element (24);

a pressure booster (11) provided in said multi-part injector body, said pressure booster (11) comprising a pressure booster piston (14), a working chamber (12) on one side of said piston and a differential pressure chamber (17) on an opposite side of said pressure booster piston, said pressure booster piston (14) sealing the working chamber (12) off from the differential pressure chamber (17), said pressure booster piston (14) being actuated by means of a pressure change in said differential pressure chamber

(17), a high-pressure chamber (19) defined, at least in part, by an end face (14a) of the pressure boosting piston (14);

a nozzle chamber inlet (22) hydraulically connecting the nozzle chamber (23) with the high-pressure chamber (19);

a control chamber (20) hydraulically connected to the high-pressure chamber (19);

an on-off valve (5, 70) for actuating said fuel injection device (1);

a central control line (31) extending through said pressure booster piston (14), said pressure change in the differential pressure chamber (17) of the pressure booster (11) occurring via the central control line (31); and

wherein the central control line (31) extends essentially coaxially to an axis of symmetry of the pressure booster piston (14),

wherein the central control line (31) extends through the working chamber (12) of the pressure booster (11) and further comprising a high-pressure-tight connection (33, 50, 61) for sealing off said central control line (31) from said working chamber (12).

21. (Previously presented) The fuel injection device according to claim 20, wherein the central control line (31) extends essentially coaxial to the symmetry axis of the injector body (4; 8, 9, 10).

Claim 22. (Canceled)

23. (Currently amended) ~~The fuel injection device according to claim 38 A fuel injection device (1) adapted to be connected to a high-pressure source (2), said fuel injection device (1) comprising:~~

a multi-part injector body (4; 8, 9, 10);

an injection valve element (24) in said multi-part injector body for blocking or unblocking at least one injection opening (25);

a nozzle chamber (23) enclosing the injection valve element in the region of a pressure shoulder provided on the injection valve element (24);

a pressure booster (11) provided in said multi-part injector body, said pressure booster (11) comprising a pressure booster piston (14), a working chamber (12) on one side of said piston and a differential pressure chamber (17) on an opposite side of said pressure booster piston, said pressure booster piston (14) sealing the working chamber (12) off from the differential pressure chamber (17), said pressure booster piston (14) being actuated by means of a pressure change in said differential pressure chamber (17), a high-pressure chamber (19) defined, at least in part, by an end face (14a) of the pressure boosting piston (14);

a nozzle chamber inlet (22) hydraulically connecting the nozzle chamber (23) with the high-pressure chamber (19);

a control chamber (20) hydraulically connected to the high-pressure chamber (19);

an on-off valve (5, 70) for actuating said fuel injection device (1);

a central control line (31) extending through said pressure booster piston (14),
said pressure change in the differential pressure chamber (17) of the pressure booster
(11) occurring via the central control line (31); and

wherein the central control line (31) extends essentially coaxially to an axis of
symmetry of the pressure booster piston (14),

wherein the pressure booster piston (14) contains a line section (34, 60, 74) of the central control line (31) through which a conduit (40) constituting the central control line (31) extends in the working chamber (12) of the pressure booster (11).

24. **(Previously presented)** The fuel injection device according to claim 23, wherein the conduit (40) feeds into a recess (35) inside a first housing part (8) of the injector body (4; 8, 9, 10), which recess is connected to the on-off valve (5, 70) via an overflow line (43).

25. **(Previously presented)** The fuel injection device according to claim 23, wherein the line section of the central control line (31) is embodied as a tubular piston extension (34).

26. **(Withdrawn)** The fuel injection device according to claim 23, wherein the line section of the central control line (31) is embodied as a coaxial piston (74) that the pressure booster piston (14) can move in relation to.

27. **(Previously presented)** The fuel injection device according to claim 20, wherein the pressure booster piston (14) contains a line section (34, 60, 74) of the central control line (31) through which a conduit (40) constituting the central control line (31) extends in the working chamber (12) of the pressure booster (11), and wherein the line section (34) of the central control line (31) supports a sealing sleeve (36) that can move in relation to said line section (34) and that produces a high-pressure seal (33) for the working chamber (12) and a spring (38, 76) for biasing said sealing sleeve.

28. **(Withdrawn)** The fuel injection device according to claim 20, wherein the pressure booster piston (14) contains a line section (34, 60, 74) of the central control line (31) through which a conduit (40) constituting the central control line (31) extends in the working chamber (12) of the pressure booster (11) and wherein the line section (34) has a high-pressure-tight guide section (50) that is guided in a first housing part (8) of the injector body (4; 8, 9, 10).

29. **(Withdrawn)** The fuel injection device according to claim 20, wherein the pressure booster piston (14) contains a line section (34, 60, 74) of the central control line (31) through which a conduit (40) constituting the central control line (31) extends in the working chamber (12) of the pressure booster (11) and wherein a piston part (60) that constitutes a line section of the central control line (31) and is encompassed by the pressure booster piston (14)

is contained in the pressure booster piston in a sliding fashion and in its head region, is provided with a sealing surface (61) that represents a high-pressure-tight connection.

30. **(Previously presented)** The fuel injection device according to claim 27, wherein said spring (38, 76) rests against either the line section (74) or against an end (15) of the pressure booster piston (14) and presses the sealing sleeve (36) against the injector body (4; 8, 9, 10).

31. **(Withdrawn)** The fuel injection device according to claim 23, wherein a piston part (60) that constitutes said line section of the central control line (31) as a hydraulically effective surface and is pressed against a boundary surface of the working chamber (12) of the pressure booster (11) by fluid contained in the working chamber (12), thus producing a high-pressure-tight connection (61).

32. **(Withdrawn)** The fuel injection device according to claim 23, wherein the differential pressure chamber (17) is connected to the central control line (31) by first and second outlet cross sections (77, 78) and wherein the second outlet cross section can be controlled in a stroke-dependent manner.

33. **(Withdrawn)** The fuel injection device according to claim 32, further comprising a control chamber (20) connected to the first outlet cross section (77), the pressure change in the differential pressure chamber (17) occurring via the control chamber (20).

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34. **(Withdrawn)** The fuel injection device according to claim 32, wherein the second outlet cross section (78) is greater than the cross section of the first outlet cross section (77).

35. **(Previously presented)** The fuel injection device according to claim 38, wherein the on-off valve (5) is embodied as a 3/2-way valve.

36. **(Withdrawn)** The fuel injection device according to claim 38, wherein the on-off valve (70) is embodied as a servo-hydraulic 3/2-way valve.

Claim 37. **(Canceled)**

38. **(Previously presented)** A fuel injection device (1) adapted to be connected to a high-pressure source (2), said fuel injection device (1) comprising:

 a multi-part injector body (4; 8, 9, 10);
 an injection valve element (24) in said multi-part injector body for blocking or unblocking at least one injection opening (25);
 a nozzle chamber (23) enclosing the injection valve element in the region of a pressure shoulder provided on the injection valve element (24);
 a pressure booster (11) provided in said multi-part injector body, said pressure booster (11) comprising a pressure booster piston (14), a working chamber (12) on one side of said pressure booster piston and a differential pressure chamber (17) on an opposite side of said

pressure booster piston, said pressure booster piston (14) sealing the working chamber (12) off from the differential pressure chamber (17), said pressure booster piston (14) being actuated by means of a pressure change in said differential pressure chamber (17), and a high-pressure chamber (19) defined, at least in part, by an end face (14a) of the pressure booster piston (14);

a nozzle chamber inlet (22) hydraulically connecting the nozzle chamber (23) with the high-pressure chamber (19);

a control chamber (20) hydraulically connected to the high-pressure chamber (19);

an on-off valve (5, 70) for actuating said fuel injection device (1);

a central control line (31) extending through said pressure booster piston (14), said pressure change in the differential pressure chamber (17) of the pressure booster (11) occurring via the central control line (31); and

wherein the central control line (31) extends essentially coaxially to an axis of symmetry of the pressure booster piston (14).